IOM manual

2011 rev 1

Instructions for installation, operation and maintenance. Metal series air operated diaphragm pumps in aluminum, cast iron and stainless steel.

Pump models:

TX25
T/TX70
T/TX120
T/TX220
T/TX420
TX820

Read this instruction manual carefully, before you install and operate the pump

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Declaration of conformity

Machinery directive 2006/42/EC

Tapflo AB declares that:

Product name: **Air operated diaphragm pumps**
Models: **T…**

Is in conformity with the essential health and safety requirements and technical construction file requirements of the EC Machinery directive 2006/42/EC.

Manufacturer: **Tapflo AB**

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Tapflo AB, January 2:nd 2010

Håkan Ekstrand
Managing director

0. GENERAL

0.1 Introduction

The Tapflo Air Operated Diaphragm Pump range is a complete serie of pumps for industrial applications. The pumps are designed to be safe simple and easy to use and maintain. The construction is sealless and without rotating parts. The pumps are suitable for almost all different chemicals used by the industry today..

With proper attention to maintenace, Tapflo Pumps will give efficient and trouble free operation. This instruction manual will familiarise operators with detailed information about installing, operating and maintaining the pump.

0.2 The warning symbols

The following warning symbols are present in this instruction manual. This is what they say.

This symbol stands next to all safety instructions in this instruction manual where danger to life and limb may occur. Observe these instructions and proceed with utmost caution in these situations. Inform also other users of all safety instructions. In addition to the instructions in this instruction manual, the general safety and accident prevention regulations must be observed.

This signal stands at points in this instruction manual of particular importance for compliance with regulations and directives, for correct work flow and for the prevention of damage to and destruction of the complete pump or its subassemblies.

1. INSTALLATION

1.1 Receiving inspection

Although precaution is taken by us when packing and shipping, we urge you to carefully check the shipment on receipt. Make sure that all parts and accesories listed on the packing list are accounted for. Immediately report any damage or shortage to the transport company and to us.

1.2 Storage

If the equipment is to be stored prior to installation, place it in a clean location. Do not remove the protective covers from the suction, discharge and air connections which have been fastened to keep pump internals free of debris. Clean the pump thoroughly before installation.

1.3 Foundation

The pump will operate properly without being fixed to a foundation. If fixation is needed for an installation, make sure the foundation is able to absorb vibrations. Use the fixing holes on the foot of the pump housings. It is essential for the operation of the pump to mount the pump with the feet in a downward direction (see sketch on next page).

1.4 Suction and discharge pipings

Suction and discharge piping should be fully supported and anchored near to but independent of the pump. The piping to the pump should be a hose, to prevent undue stress and strain on the pump connections and the pipings.

1.4.1 Turnable connections

The suction and discharge connections are turnable 180°. This simplifies the assembling and installation considerably. If you wish to turn the connections, slightly release the pump housing screws, then screw a threaded nipple into the connection and turn.

1.4.2 Connection of suction pipe

Remember that the suction pipe/connection is the most critical point, especially if the pump is priming. Just a small leakage will dramatically reduce the suction capability of the pump. When connecting the suction pipe, following is recommended.

1) For satisfactory operation, use reinforced hose or corresponding (the suction power may otherwise shrink the hose). The internal diameter of the hose should be the same as on the suction connection (at the bottom of the pump) to have best suction capability.

2) Make sure that the connection hose - pump is completely tight, otherwise the suction capability will be reduced.

3) Always use as short suction pipe as possible. Avoid air pockets which can arise with long pipings.

1.4.3 Connection of discharge pipe

For this connection it is only recommended a simple and positive flow connection. Use a hose or flexible piping (minimum one meter) between the discharge connection and any rigid fixed piping. Coil the hose at least one turn. All components (hose, pipe, valves etc) on the discharge piping must be designed for minimum PN 10.

1.5 Air connection

Screw the air hose into the air intake on the center block of the pump with for example a bayonet coupling. For best efficiency, use the same hose diameter as the internal diameter of the connection on the air intake.

1.5.1 Air treatment system

The air valve is constructed for oilfree air. Lubrication of the air is ***not allowed.*** However, if the air is ***very dry*** (laboratory air), the air may be lubricated with water. Maximum air pressure is 8 bar. As prevention purpose, a filtration of the air by means of a 5 micron filter or finer is recommended. Dirt in the air can under unfortunate circumstances be the cause of breakdown. Recomended air quality according to PN-ISO8573 is particles class 3, water class 4 and oil class 3 .

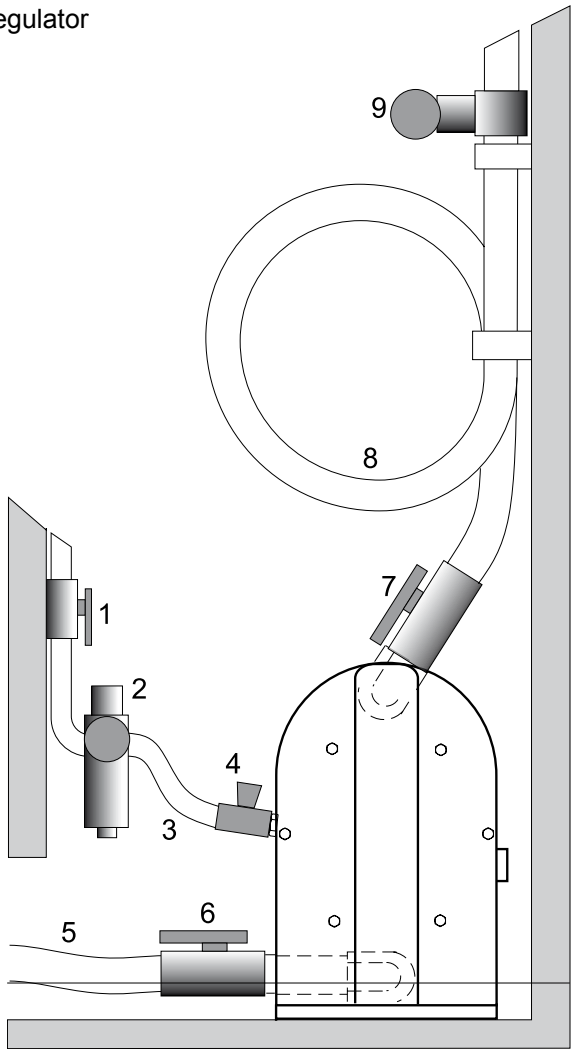
To facilitate the operation of the pump we recommend an air treatment system connected to the air supply. These components should be included:

1) Regulator to adjust the air pressure
2) Manometer to read the actual pressure
3) Needle valve to adjust the air flow
4) Filter

These components are included in Tapflos **Air treatment system** which can be ordered from us.

1.6 Example of installation

1) Gate valve compressed air
2) Filter and pressure regulator
3) Flexible hose
4) Needle valve
5) Flexible piping
6) Gate valve suction
7) Gate valve discharge
8) Coiled flexible piping
9) Flow gauge



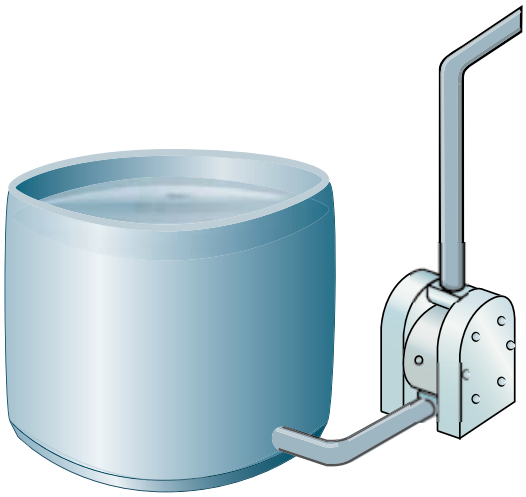
1. INSTALLATION

1.7 Recommended installations

The Tapflo pump is flexible in the way you are able to install it. The in- and outlet ports are infinitely turnable more than 180° to fit various piping systems.

1.7.1 Flooded

The piping system is designed with a positive suction head. This is the best way of installtion where it is necessary to completely evacuate all liquid from the container, or where viscous (thick) products are transfered.

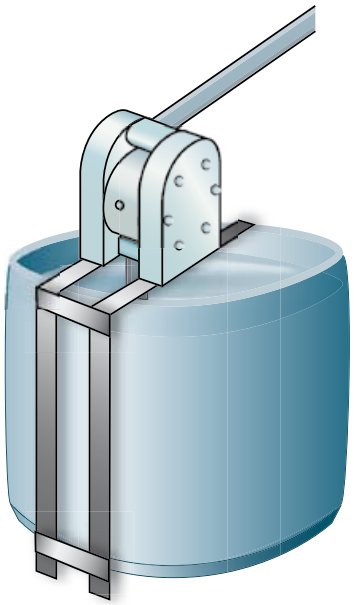


Important

Do not exceed 0,7 bar suction pressure. Higher pressure may cause premature diaphragm failure and irregular pump operation.

1.7.2 Selfpriming

The Tapflo pump is designed to pull a high vacuum. It is able to evacuate an empty suction pipe without any damage to the pump. The suction lift is up to 5 meter (16.4 ') from an empty suction pipe and up to 8 meter (26.2') from a wetted pipe. The suction capability depends on the pump size (see chapter 5.4)



1.7.3 Submerged

All Tapflo pumps may be submerged into the liquid. It is important to make sure that all components which are in contact with the liquid are chemically compatible. The air exhaust must be led to the athmosphere by means of a hose.

Air exhaust port dimension

Pump size	Air exhaust port
T25 and T70	1/2" BSP
T120 in alu and cast iron	1/2" BSP
T120 in stainless steel	1" BSP
T220, T420 and T820	1" BSP

2. OPERATION

2.1 Health and safety

The pump must be installed according to local and national safety rules.

The pumps are constructed for particular applications. Do not use the pump on applications different from that for which it was sold without consulting us to ascertain its suitability.

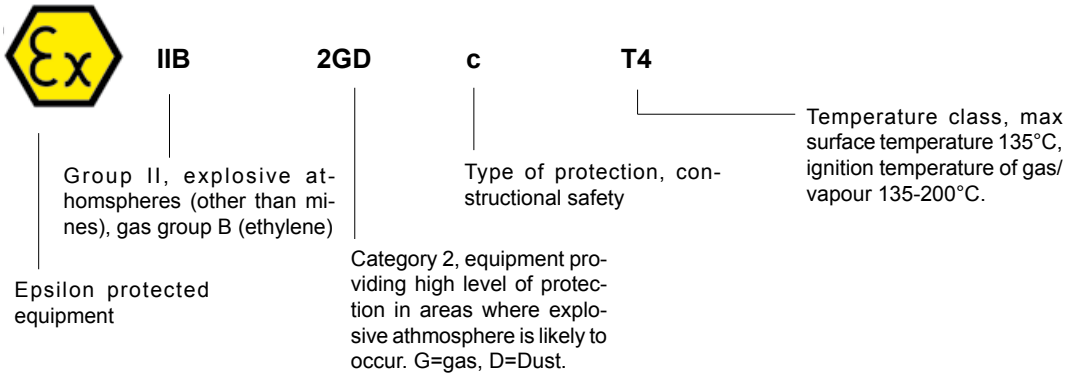
2.1.1 Protection

In the interest of health and safety it is essential to wear protective clothing and safety goggles when operating, and/or working in the vicinity of Tapflo pumps.

2.1.2 Environments in danger of explosion - ATEX

The standard stainless steel pumps are not allowed to operate in environments in danger of explosion. Static electricity may occur in the pump under operation, which may cause explosion and injury. Special conductive pumps TX are available for such applications. All our aluminium and cast iron pumps are by standard ATEX approved, having model names TX... If you have purchased an ATEX approved pump (models TX...), follow below instructions and local/national rules for safe use.

ATEX (directive 94/9/EC) classification of Tapflo TX pumps:


Ex
IIB
2GD
c
T4
Temperature class, max surface temperature 135°C, ignition temperature of gas/ vapour 135-200°C.
Type of protection, constructional safety
Group II, explosive athomspheres (other than mines), gas group B (ethylene)
Epsilon protected equipment
Category 2, equipment providing high level of protection in areas where explosive athmosphere is likely to occur. G=gas, D=Dust.

Earth connection of pump and other equipment

Connect a suitable earth wire to the stainless steel earth connection that is placed on the inside of one of the pump housings. Connect the other end of the earthwire to earth and also make sure that other equipment like hoses/pipes/containers etc are properly earthed/connected.

2.1.3 Air pressure

The maximum air pressure for Tapflo pumps is 8 bar. Higher air pressure than 8 bar can damage the pump and may cause injury to personel in vicinity of the pump. If you intend to apply a higher air pressure than 8 bar, please consult us.

2.1.4 Noise level

At tests, the noise level from a Tapflo pump has not exceeded 80 dB(A). Under some circumstances, for example if the pump is operating under high air pressure at low discharge head, the noise can be inconvenient or hazardous for personel staying for long periods in vicinity of the pump. This hazard can be prevented by:

- using suitable ear protection
- lower the air pressure and/or raise the discharge head
- lead the outcomming air from the place by connecting a hose from the muffler connection of the pump. You will find the air exhaust dimension in chapter 1.7.3.
- use elastomer valve balls (EPDM, NBR or polyurethane) instead of PTFE, ceramic or stainless steel, provided that the elastomer is compatible with the pumped liquid.

2. OPERATION

2.1.5 Temperature hazards

Raised temperature can cause damage on the pump and/or pipings and may also be hazardous for personel in the vicinity of the pump/pipings. Avoid quick temperature changes and do not exceed the maximum temperature specified when the pump was ordered. See also general max temperatures based on water in chapter 5 "Data".

2.2 Before starting the pump

- Make sure the pump is installed accordning to the installation instruction (section 1).
- Filling of the pump with liquid before start is not necessary.
- When installation is new or reinstalled, a test run of the pump with water should be conducted to make sure the pump operates normally and does not leak.

- When installation is new or reinstalled, check the pump housing nut tightening torque (see chapter 5.5 "Data"). After approx 1 week operation, the torque should be checked again. This is important to prevent leakage.

2.3 Starting and operating

- Open the discharge valve.
- ***Note! Considering the suction capacity when air is still in the suction pipe, it is recommended to start with low air pressure/flow in the beginning. This is not necessary if the pump is filled with liquid before start.***
- When the pump has been filled with liquid, the air pressure/flow may be raised to increase the suction capacity of the pump.
- The performance of the pump can be adjusted through the air supply by using a needle valve and a pressure regulator. The performance can also be adjusted by normal flow control on the discharge side of the system.

2.3.1 Dry running

The pump may run dry without any problem. If the pump runs dry for longer periods, it may cause premature wear of the components. Dry run protection systems are available, please contact us.

2.3.2 Optimizing the pump lifetime

Running at full frequenzy (maximum air pressure/flow) continiously will cause premature wear of the components. As a general rule, we recommend to run at half of the maximum capacity of the pump. For instance, a T120 pump should run continious maximum at 60 l/min.

2.4 Pump stopping

The pump can be stopped in two ways:

1) Close the discharge valve. The pressure from the system will stop the pump automatically. This will not do any damage to the pump. The pump restarts easy when the valve is opened again.
2) Stop the air supply.

3. MAINTENANCE

3.1 When the pump is new or reassembled

If the pump is new or reassembled after maintenance it is important to retighten the pump housing screws (pos 37) after a few days of operation. Make sure to use the right torque, see chapter 5.5.

3.1.1 Performance test

When installation is new, a test run of the pump should be conducted. Gauge the capacity at specific air pressure/flow. This information is for use in checking performance as wear takes place. You will be able to set schedules for maintenance of the pump and to select spare parts to be kept on stock.

3.2 Routine inspection

Frequent observation of the pump operation is recommended to detect problems. A change in sound of the running pump can be an indication of weared parts (see below "location of faults"). Leaking liquid from the pump and changes of performance may also be detected. Routine inspections should be conducted frequently.

3.3 Complete inspection

The intervals for a complete inspection depend upon the operation conditions for the pump. The characteristics of the liquid, temperature, materials used in the pump and running time decide how often a complete inspection is necessary.

If a problem has occured, or if the pump is in need of a complete inspection, see later this chapter "location of faults" and "dismantling of the pump". You are of course warmly welcome to consult us for further help.

Weared parts should be carried in stock, see chapter 4.3.

3.4 Location of faults

Problem	Possible fault
The pump does not run	The air pressure is to low The air connection is blocked Muffler is blocked Air valve is defect Dirt in the pump chamber Diaphragm breakdown
The suction is bad	Suction connection is not tight Suction connection is blocked Muffler is blocked Valve balls are blocked Valve balls are damaged
The pump runs irregularly	Valve balls are blocked Sealings are defect in air valve or center block Diaphragm breakdown
Bad flow/pressure	Pressurefall in incomming air Suction or air connection blocked Muffler is blocked Air valve is defect Valve balls worn out/broken Air in liquid Diaphragm breakdown
Liquid leaks from the pump	Screws on the housing not properly fastened
Liquid comes out of the muffler	Diaphragm breakdown

3.5 Dismantling of aluminium and cast iron pumps

The numbers put in brackets, refer to the part numbers in the spare part drawings and spare part lists in chapter 4.

3.5.1 Before the dismantling procedure

Be sure to drain all liquid from the pump. Cleanse or neutralize the pump thoroughly. Disconnect the air connection and then the suction and discharge connections.

3.5.2 Mainparts

Fig 5.1. Unscrew the screws (37) on one side of the pump housing (11). Carefully lift off the "loose housing". Turn and lift the suction and discharge connections (13). Upend the pump and unscrew the other housing (11).

Fig 5.2. *Pumps TX25 up to TX420:*
In order to take out the valve balls (23), unscrew the valve ball stop (22) in the housing and the valve ball is free. Take out the green gaskets (18) and replace with new ones.

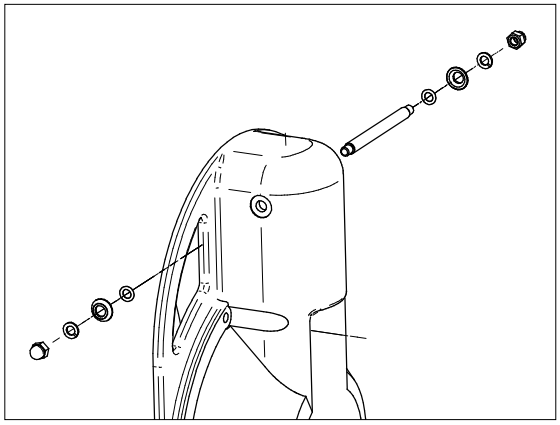


Fig 5.3. *Pumps TX820:*
Unscrew the domed nuts of the stopper assembly. Remove the stopper flanges, washers and o-rings. Carefully pull out the stopper rod.

3.5.3 Center block

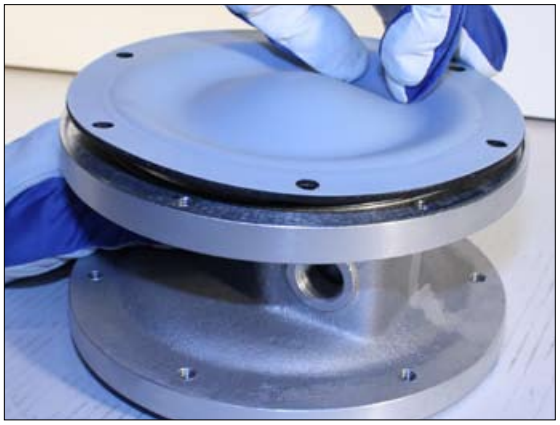


Fig 5.4. Unscrew one of the diaphragms (15) while pressing the other one towards the center block, then pull out the second diap with the diaphragm shaft.

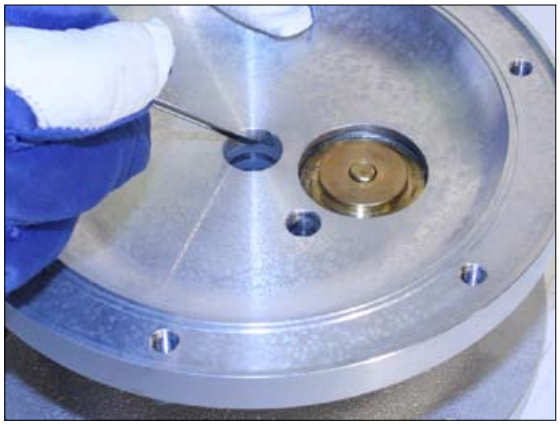


Fig 5.5. *On TX70 up to TX820:*
If the shaft sealings (36) seem to be worn out (by internal leakage of air), carefully remove them together with the backup o-rings (47) with a pointed tool. During this operation, the sealing and backup o-ring usually get destroyed, so make sure to have replacement spares on stock.

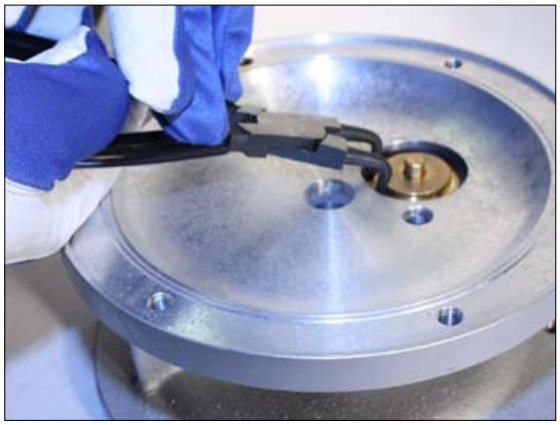


Fig 5.6. Dismantle the circlips (27) which keep the air valve (61) on it's place.

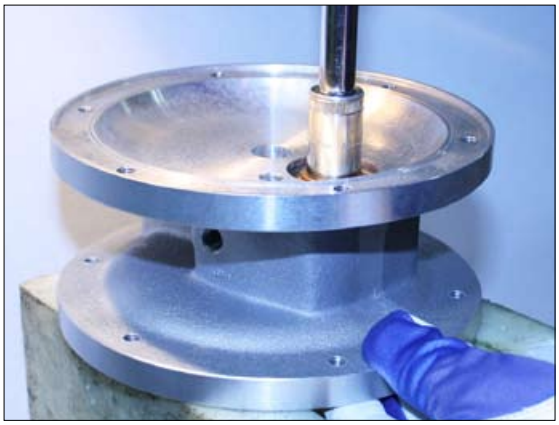


Fig 5.7. press out the air valve with for instance a wood shaft of a hammer or by means of a pressing device. Always be careful, so that you do not damage the sealing edges towards the diaphragm or the air valve.

3.6 Assembling of aluminium and cast iron pumps

Before the assembly procedure, check all components. If necessary, replace with new original spare parts. You will find recommended mounting torques in chapter 5.5.

3.6.1 Center block

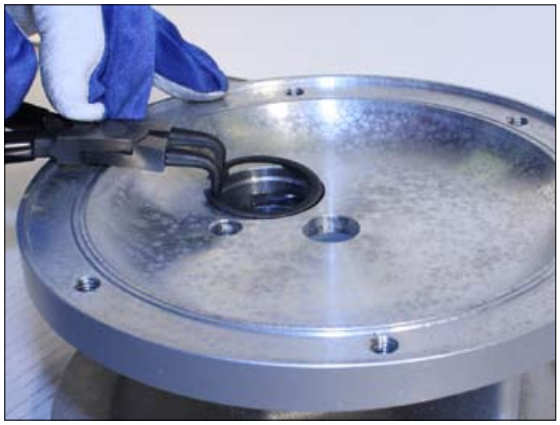


Fig 6.1. Mount the circlip (27) on one side.

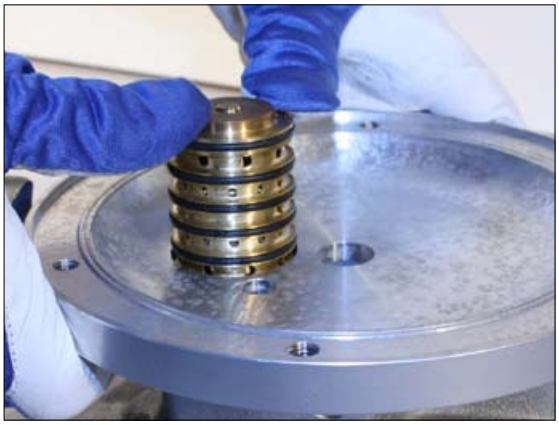


Fig 6.2. Put some alcohol or water on the air valve o-rings (30) and then carefully push the air valve (61) into the housing. On the bigger pumps, it can be necessary to use a pressing device for this operation. Make sure that the o-rings (30) remain in the right position. Mount the remaining circlip (27).

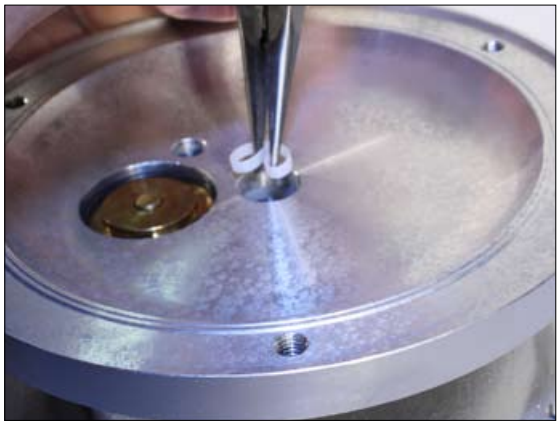


Fig 6.3. *On TX70 up to TX820:*
Put in new o-rings (47) and shaft seals (36) in the grooves of the diaphragm shaft hole. To insert the shaft seal, bend it to a kidney shape.

Fig 6.4. Mount the pin screw (part of the diaphragm shaft pos 16) securely in the diaphragm (15) by means of an allen key.

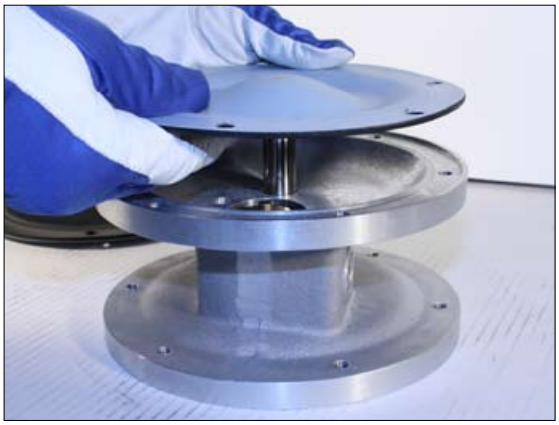


Fig 6.5. Mount the diaphragm shaft (16) on the diaphragm (15) and push the assembly carefully through the hole in the centerblock (12). Screw the next diaphragm (15) onto the shaft (16) and fix the holes. Sometimes you have to turn the diaphragms a little back to get the holes positioned.

3.6.2 Main parts

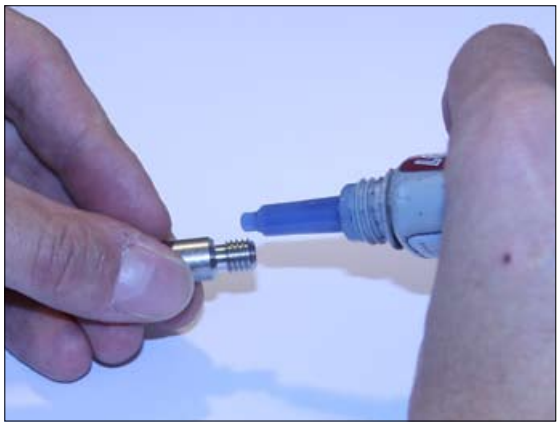


Fig 6.6. *Pumps TX25 up to TX420*
We recommend using a drop of thread lock type Loctite 243 on the ball stop (22).

Fig 6.7. *Pumps TX25 up to TX420*
Place the valve balls in their seats, mount the ball stops securely. Put new gaskets (18) in the seats of the housings. Mount the center block assembly with one of the housings. Place the o-rings (18) on the in/outlets. Put the in/outlets in desired position on the housing. Carefully lay the other housing on the assembly.

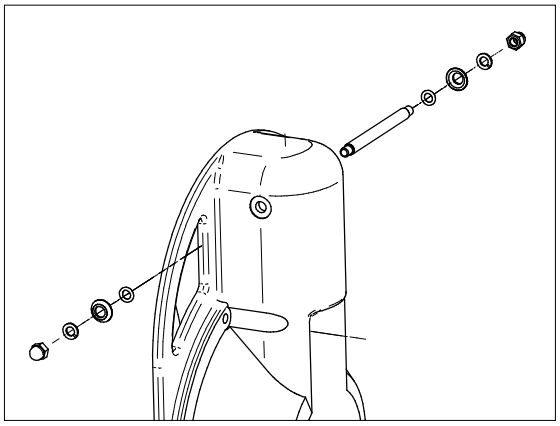


Fig 6.8. *Pump TX820:*
Push the stopper rod through the housing. Mount o-ring, stopper flanges and domed nuts and then tighten.

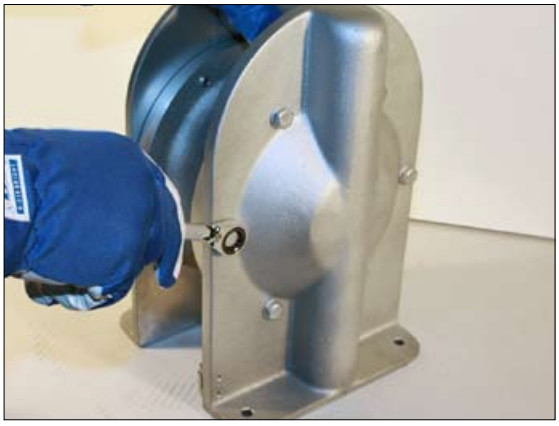


Fig 6.9. Mount the centerblock assembly on one of the housings (11). Position the in/outlets (13) and o-ring/gasket (18) while the housing is laying on the side. Carefully put on the other housing (11). Tighten the screws (37) eqaully, recommended tightening torque you find in chapter 5.5.

3. MAINTENANCE

3.7 Dismantling of stainless steel pumps

The numbers put in brackets, refer to the part numbers in the spare part drawings and spare part lists in chapter 4.

3.7.1 Before the dismantling procedure

STOP

Be sure to drain all liquid from the pump. Cleanse or neutralize the pump thoroughly. Disconnect the air connection and then the suction and discharge connections.

3.7.2 Main parts

Fig 7.1. Unscrew the housing nuts (37).

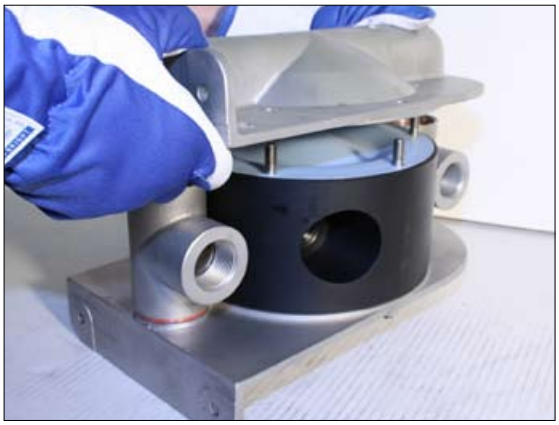


Fig 7.2. Carefully remove the "loose housing" (11) and lift off the in/outlets (13).Pull up the center block assembly, be careful not to damage the hole edges of the diaphragms (15).

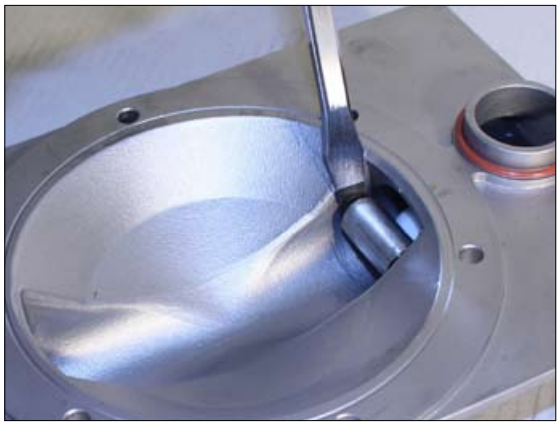


Fig 7.3. *Pumps T70 and T120**

In order ot take out the valve balls (23), carefully remove the stop assembly (22) by means of a screw driver. The assembly is spring loaded and may easily pop out - be careful not to hurt your eyes.

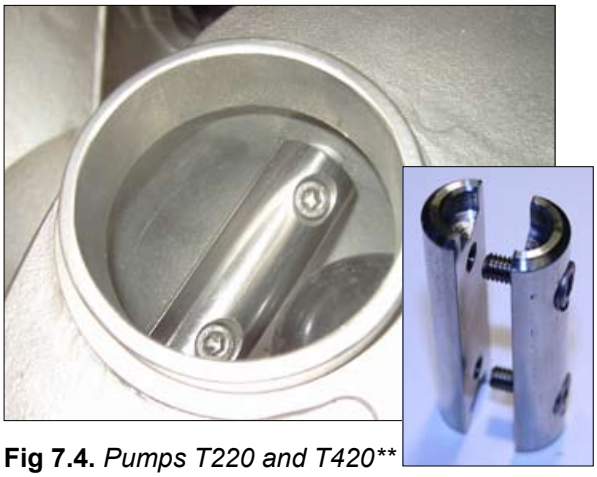


Fig 7.4. *Pumps T220 and T420***

Unscrew the allen screws (227) from the upper (22U) and lower (22L) ball stop assemblies. Carefully remove the screws and the half rods.

* = Also on T220 and T420 older than serial No 1105 .... (YYMM)
** = From serial No 1106 .... and newer

3.7.3 Center block with circlip (T70 and T120)

This instruction applies to above mentioned pumps and older models of T220 (serial numbers 0803 .... and older) and T420 (serial numbers 0801 .... and older).

Fig 7.5. Press the diaphragms (15) to their neutral position (both have the same distance to the center block). Hold one of the diaphragms (15) and unscrew the other. Then pull out the remaining diaphragm (15) with the diaphragm shaft (16).

Fig 7.6. If the shaft sealings (36) seem to be worn out (by internal leakage of air), carefully remove them with a pointed tool. During this operation, the sealing (36) and backup o-ring (47) usually get destroyed, so make sure to have replacement spares available.

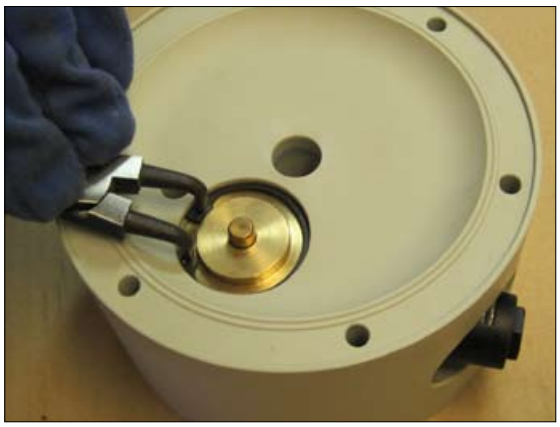


Fig 7.7. Carefully remove the circlip (27) with a circlip plier. While doing this, cover with your other hand, the circlip easily flips away! Do the same with the circlip (27) on the other side.

Fig 7.8. Press out the air valve (61) by means of a pressing device. Be careful not to damage the brass edges of the air valve.

3.7.4 Centerblock with threaded air valve, T220 and T420

This instruction applies to T220 from serial No 0803 .... until 1105 .... and T420 from serial No 0801 .... until 1105 .... Remove diaphragms (15), diaphragm shaft (16) and shaft seals (36) as described in fig 7.5-7.6.

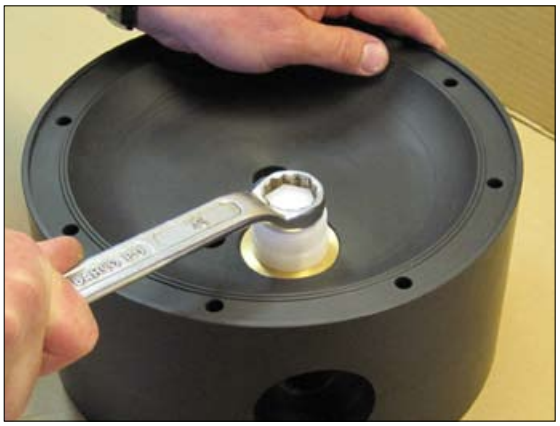


Fig 7.9. Carefully unscrew the air valve endcap by means of the mounting tool (282). Do the same with the endcap on the other side.

Fig 7.10. Now when both endcaps are removed, push out by hand the shaft and piston.

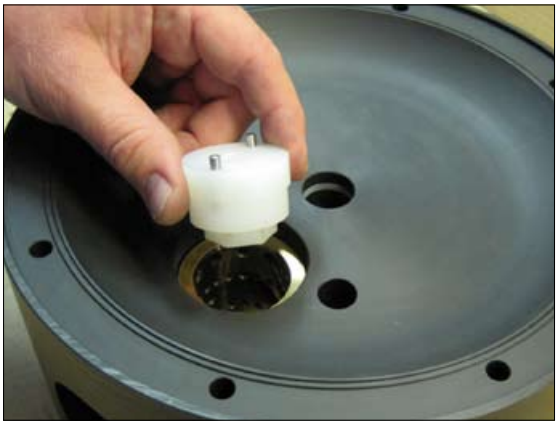


Fig 7.11. To push out the cylinder, use the other side of the mounting tool that fit into the cylinder.

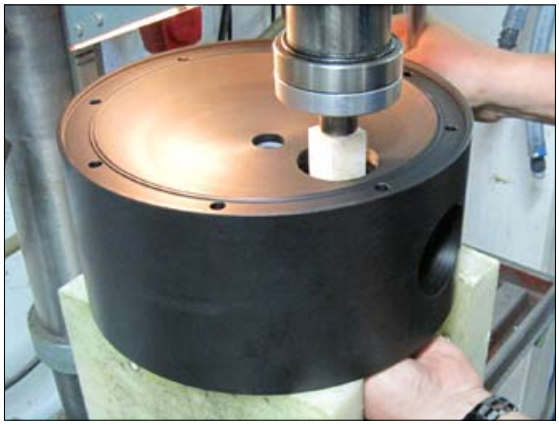


Fig 7.12. Press out the cylinder, be careful not to damage the edges of the cylinder.

3.7.5 Center block with plate mounted air valve, TX120, T220 and T420

This instruction applies to TX120 from serial No 0907 ...., T220 and T420 from serial No 1106 ....

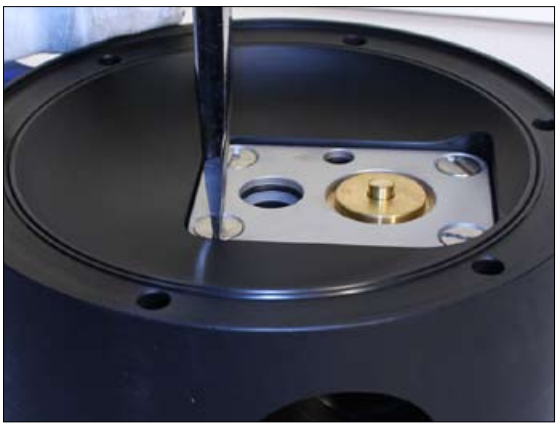


Fig 7.13. Unscrew the plate screws (2711).

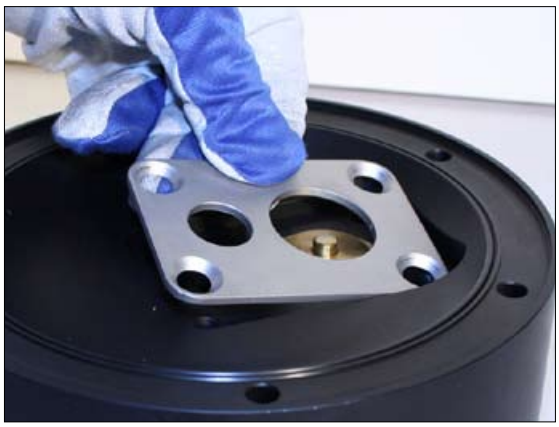


Fig 7.14. Take out the plate (271). Repeat the steps in fig 7.13 and 7.14 on the other side. Press out the air valve as described in fig 7.8.

3.8 Assembly of stainless steel pumps

3.8.1 Centerblock with circlips (T70 and T120)

This instruction applies to above mentioned pumps and older models of T220 (serial numbers 0803 .... and older) and T420 (serial numbers 0801 .... and older).

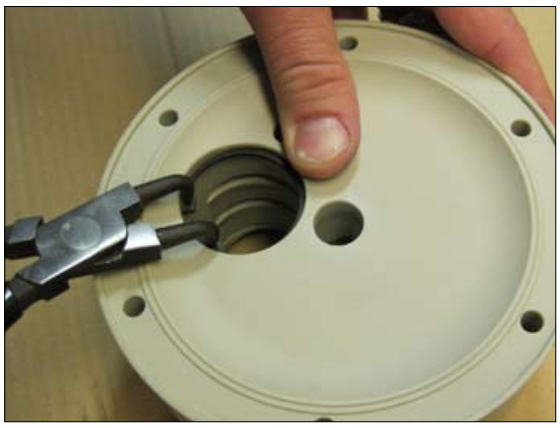


Fig 8.1. Mount the circlip (27) on one side.

Fig 8.2. Put a little water or alcohol on the o-rings (30), other lubricants should not be used. Carefully push the air valve (61) into the housing. Mount the circlip (27) on the remaining side (see fig. 8.1).

3.8.2 Centerblock with threaded air valve (T2200 and T420)

This instruction applies to T220 from serial No 0803 .... and T420 from serial No 0801 .... until 1105 ....

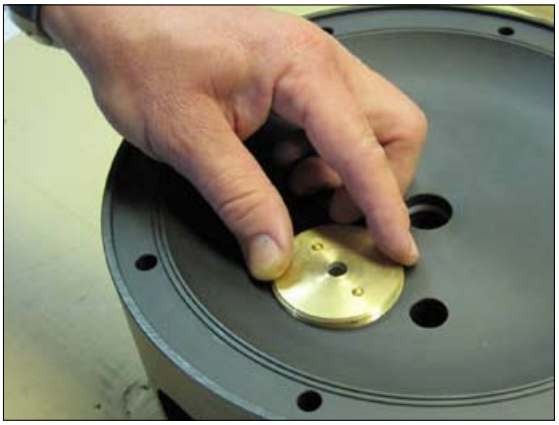


Fig 8.3. Carefully screw the endcap by hand into the centerblock (123). Sometimes you have to first screw counter clockwise until the threads match.

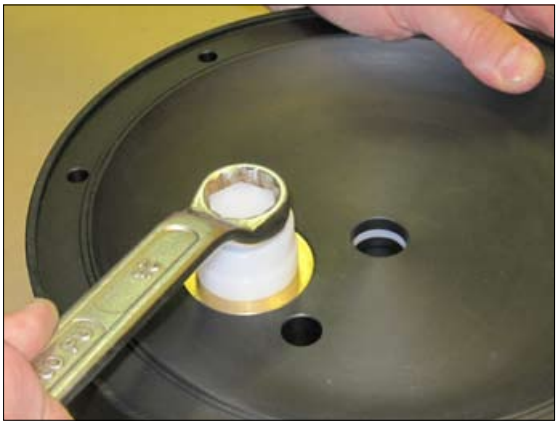


Fig 8.4. Tighten carefully by means of the mounting tool (pos 282) and a spanner.

Fig 8.5. Place one of the o-rings (pos 30) on the endcap.

Fig 8.6. Make sure all four o-rings (pos 30) are mounted on the cylinder. Use a little water or alcohol on the o-rings to easier slide the cylinder into the centerblock. Other lubricants should not be used.

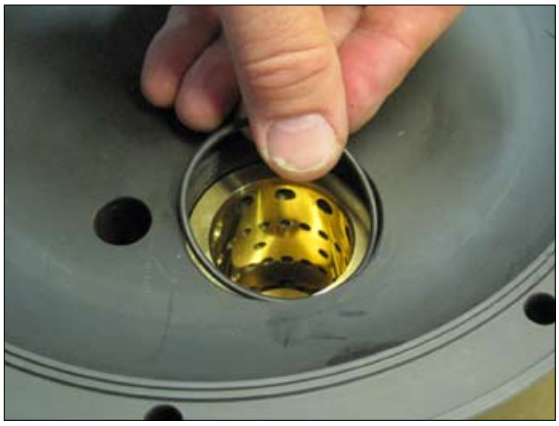


Fig 8.7. Place the last o-ring (pos 30) on the cylinder.

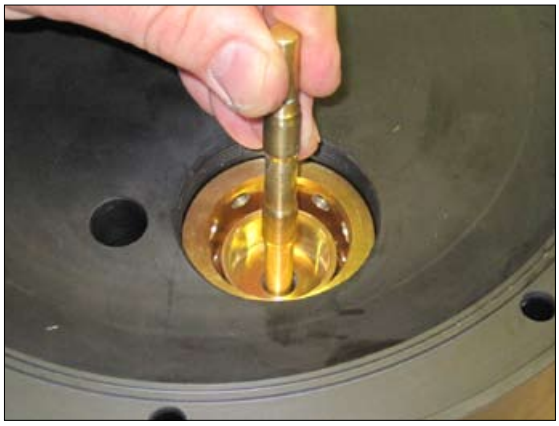


Fig 8.8. Carefully mount the piston and shaft by hand. Repeat steps Fig 8.3 and Fig 8.4 on the remaining side. Carefully secure the endcaps equally on both sides.

3.8.3 Center block with plate mounted air valve, TX120, T220 and T420

This instruction applies to TX120 from serial No 0907 .... and T220 and T420 from serial No 1106 .... and newer.

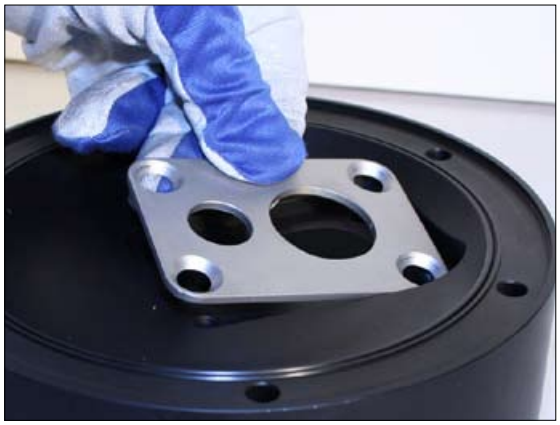


Fig 8.4. Put on the air valve plate (271) on one side of the centerblock (122) and mount with the screws (2711). Push the air valve from the other side as described in fig 8.2.

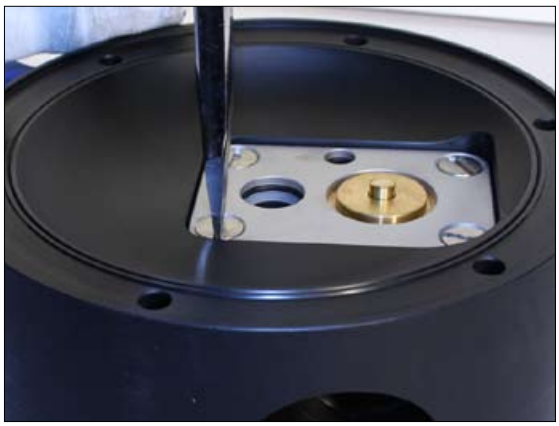


Fig 8.5. Mount the plate (271 with the screws (2711) on the remaining side.

3.8.4 Diaphragms

Fig 8.6. Insert the shaft seal o-rings (47) in the groove.

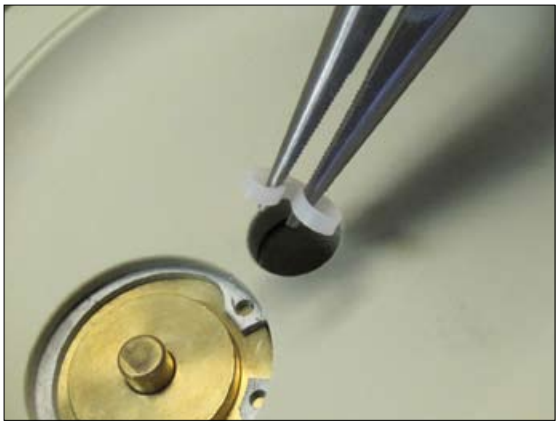


Fig 8.7. To mount the shaft seal (36), bend it to a kidney shape and insert carefully to the groove.

Fig 8.8. Mount the pin screw (part of the diaphragm shaft pos 16) securely in the diaphragm (15) by means of an allen key.

Fig 8.9. Mount the diaphragm shaft (16) on the diaphragm (15) and push the assembly carefully through the hole in the centerblock (12).

3.8.5 Main parts

This instruction applies to T70, T120 and for older pumps T220 and T420 (1105 .... and older).

Fig 8.10. The valve stop (22) consists of rod, spring and sleeve.

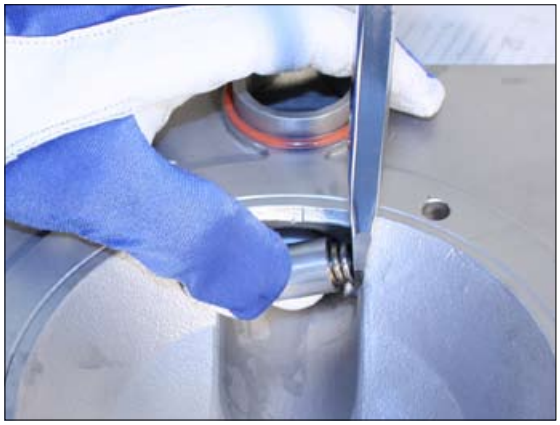


Fig 8.11. Put the valve balls in their seats (upper and lower) in both housings (11). Carefully mount the valve stop assembly by pressing the spring with a flat screw driver or similar.

This instruction applies to T220 and T420 from serial No 1106 ....

Fig 8.12.
Put the valve balls in their seats (upper and lower) in both housings (11). Mount the upper ball stop (22U) by means of the allen screws (227). Do the same with the lower ball stop (22L). Secure the allen screws (227).

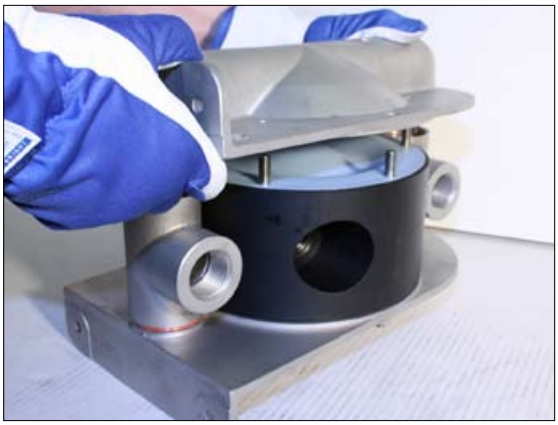


Fig 8.13. Put the pin screws (14) through one of the housings and the centerblock assembly. Place the o-rings (18) on their seats and carefully position the in/outlets (13) in desired position. Note that in/outlet position should not be changed after the pump has been tightened, it can easily damage the FEP o-rings. Carefully put on the second housing.

Fig 8.14. Tighten the nuts (37) equally, see recommended torque settings in chapter 5.5.

3.8.6 Test run and follow up draft

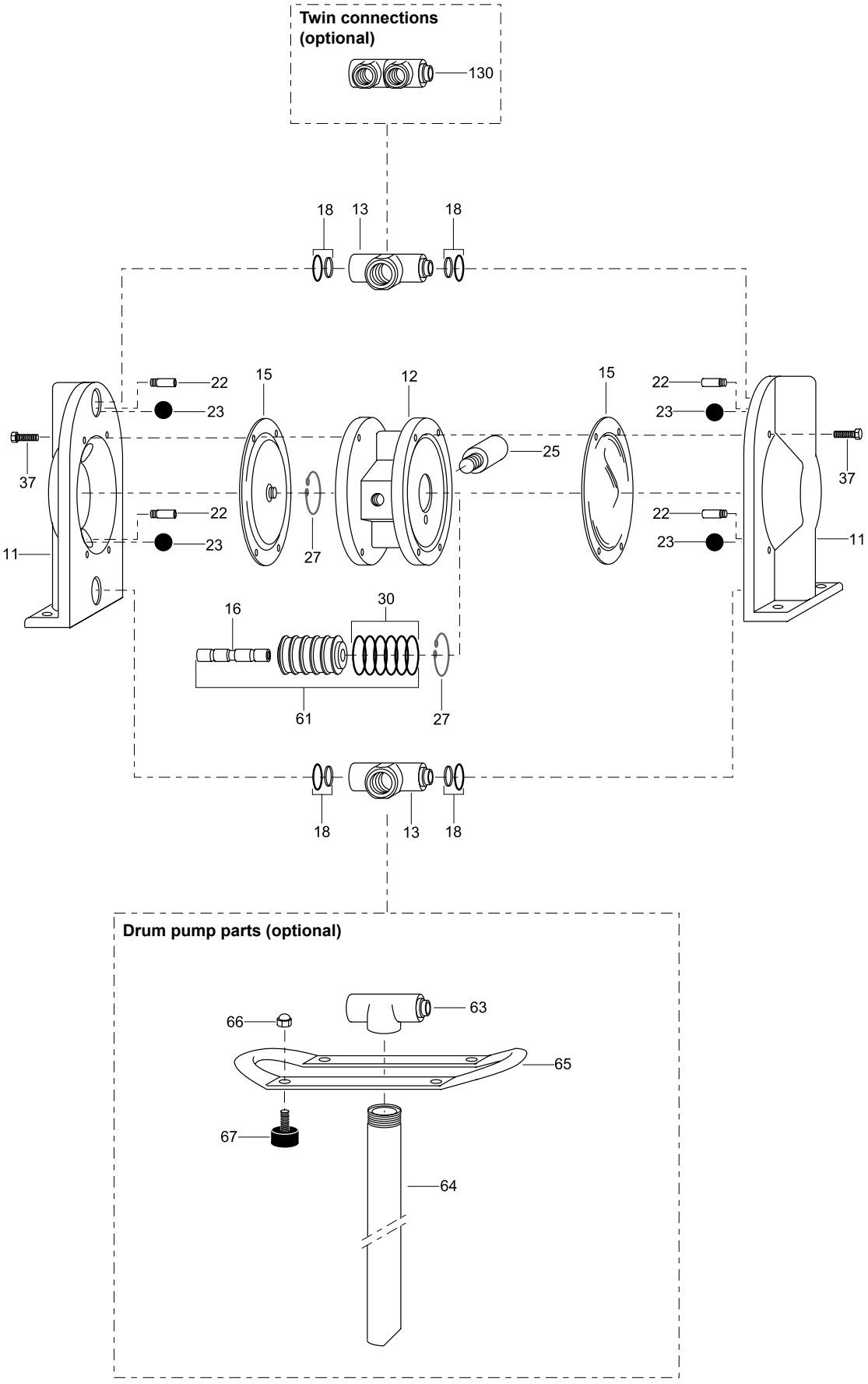
We recommend you to conduct a test run of the pump before installing it to the system so no liquid gets wasted if the pump leaks or perhaps does not start according to wrong assembling of the pump.

After a few weeks operation a follow up draft of the nuts is recommended.

4. SPARE PARTS

4.1 Spare parts aluminium and cast iron pump

4.1.1 TX25 spare part drawing

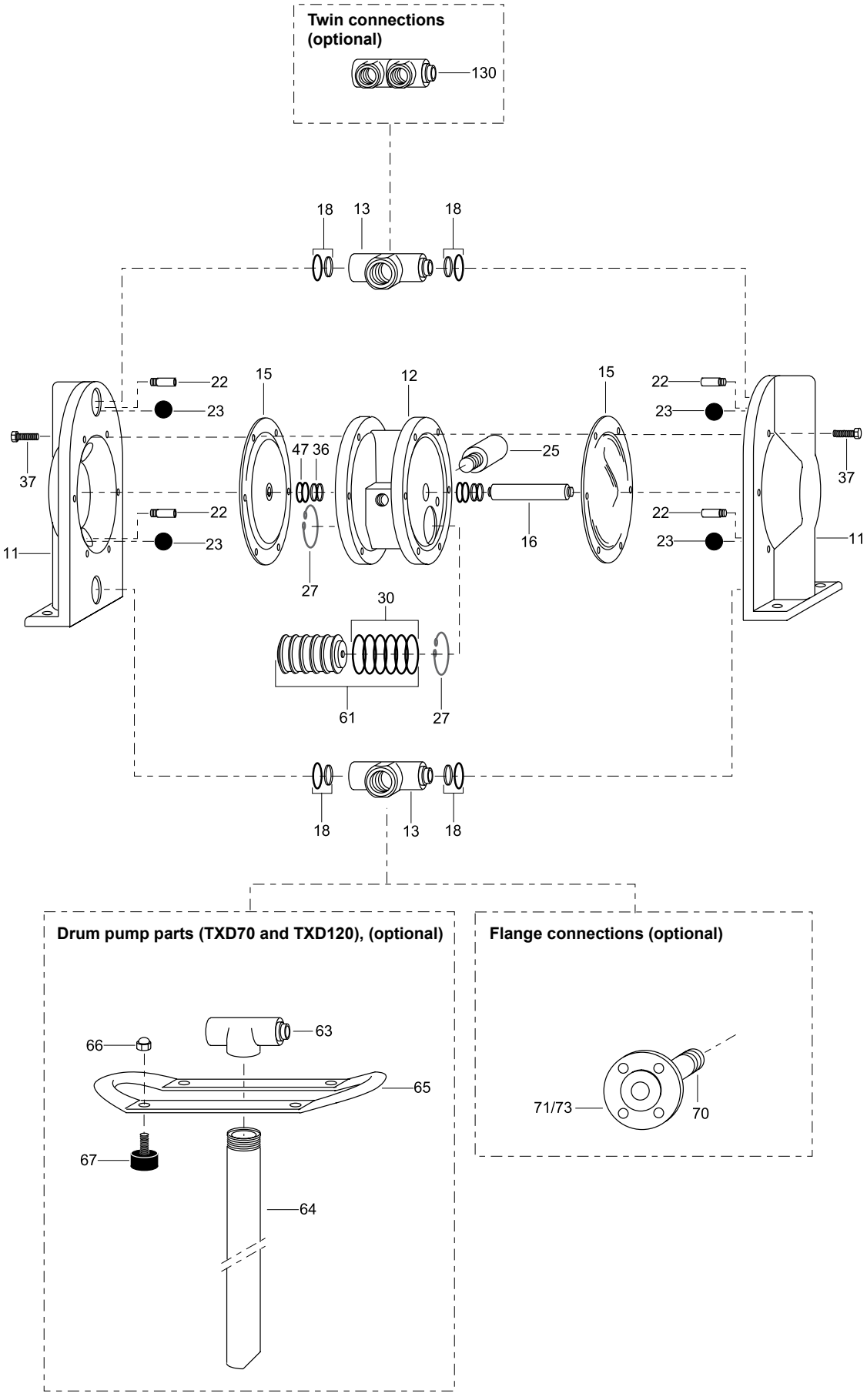


4. SPARE PARTS

4.1.2 TX25 spare part list

Pos	Description	Qty/pump	Material options	Spare part sets set 1	set2
11	Housing	2	Aluminium, cast iron or PTFE coated aluminium		
12	Center block	1	Aluminium, cast iron or PTFE coated aluminium		
13	In/outlet	2	Aluminium, cast iron or stainless steel AISI 316L		
15	Diaphragm	2	EPDM, PTFE, NBR or FKM	•	•
18	O-ring/gasket (in/outlet)	4	klinger/NBR (standard), klinger/EPDM or klinger/FKM	•	•
22	Valve ball stop	4	AISI 316		•
23	Valve ball	4	EPDM, PTFE, NBR, FKM, AISI 316, PU or ceramic	•	•
25	Muffler	1	PP	•	•
27	Circlip	2	Phosphor bronze		•
30	O-ring	6	NBR (standard), EPDM or FKM		
37	Screw	8	Steel		
61	Air valve complete	1	Brass/NBR (standard), brass/FKM or brass/EPDM		•
Options					
Twin connections					
130	Twin in/outlet	2	Aluminium or AISI 316		
Drum pump parts					
63	Drum inlet	1	Aluminium or stainless steel		
64	Pump tube	1	Aluminium or stainless steel		
65	Handle	1	AISI 316 (option on TXD25))		
66	Domed nut	4	AISI 304		
67	Rubber foot	4	NBR		

4.1.3 TX70, TX120, TX220 and TX420 spare part drawing (aluminium or cast iron)



4.1.4 TX70, TX120, TX220 and TX420 spare part list (aluminium or cast iron)

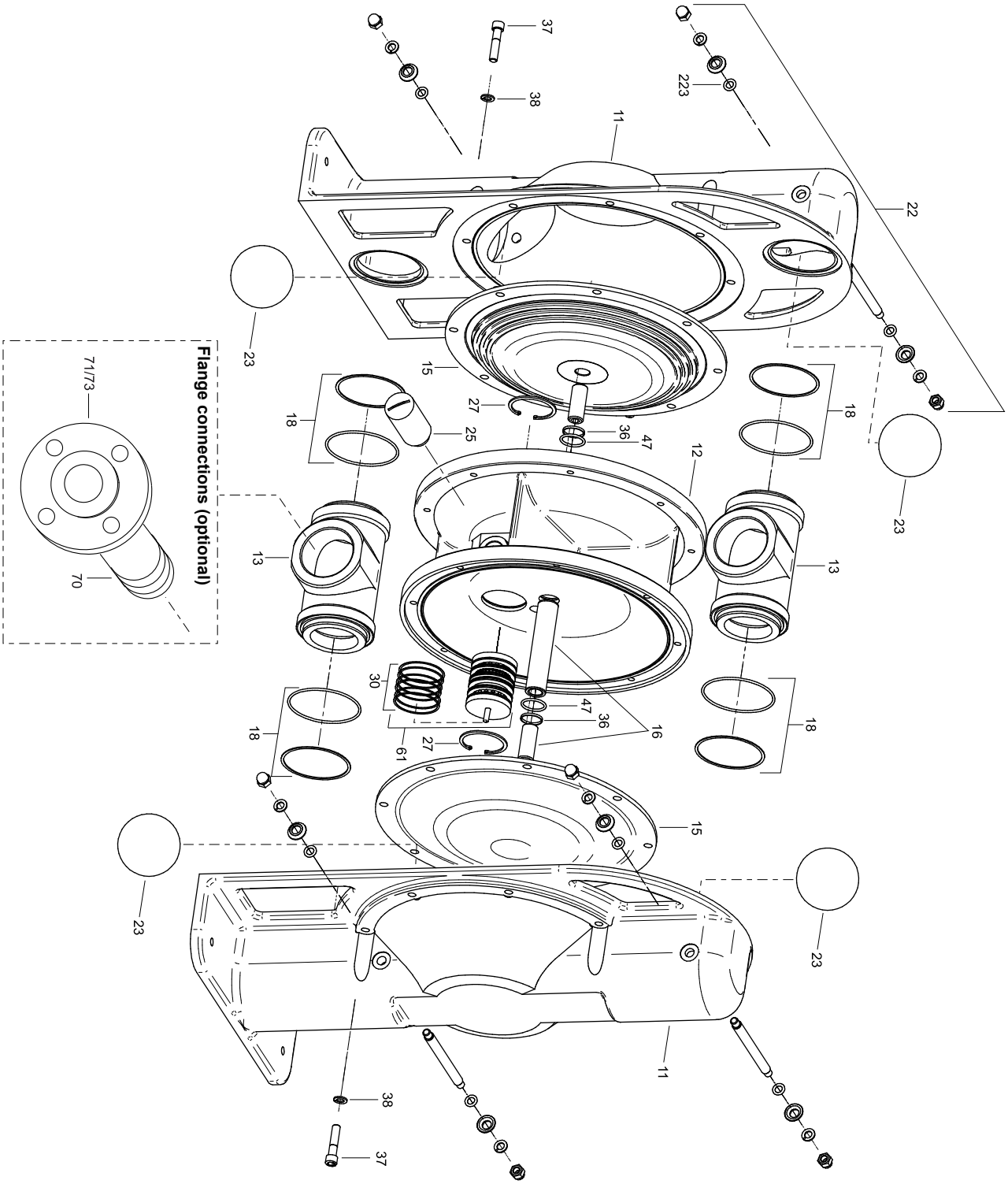
Pos	Description	Qty/pump	Material options	Spare part sets set 1	set 2
11	Housing	2	Aluminium, cast iron or PTFE coated aluminium		
12	Center block	1	Aluminium, cast iron or PTFE coated aluminium		
13	In/outlet	2	Aluminium, cast iron or stainless steel AISI 316L		
15	Diaphragm	2	EPDM, PTFE, NBR or FKM***	•	•
16	Diaphragm shaft	1	AISI 316		•
18	O-ring/gasket (in/outlet)	4	klinger/NBR (standard), klinger/EPDM or klinger/FKM	•	•
22	Valve ball stop	4	AISI 316		
23	Valve ball	4	EPDM, PTFE, NBR, FKM, AISI 316, PU or ceramic	•	•
25	Muffler	1	PP	•	•
27	Circlip	2	Phosphor bronze		•
30	O-ring	6	NBR (standard), EPDM or FKM		
36	Center block sealing	4	PE		•
37	Screw	12/16**	Steel		
47	O-ring (back up for 36)	4/8*	NBR (standard), EPDM or FKM		•
61	Air valve complete	1	Brass/NBR (standard), brass/FKM or brass/EPDM		•
Options					
Twin connections					
130	Twin in/outlet	2	Aluminium or AISI 316		
Flange connections					
70	Flange pipe	2	AISI 316		
71	Loose flange ring ANSI	2	AISI 316		
73	Loose flange ring DIN	2	AISI 316		
Drum pump parts					
63	Drum inlet	1	Aluminium or stainless steel		
64	Pump tube	1	Aluminium or stainless steel		
65	Handle	1	AISI 316 (option on TXD25))		
66	Domed nut	4	AISI 304		
67	Rubber foot	4	NBR		

* = TX120 only
** = TX220 and TX420
*** = TX70 only

Other options
For pumps with valve lift system (TXL...) please ask us for spare part drawings/lists.

4. SPARE PARTS

4.1.5 TX820 spare part drawing (aluminium)



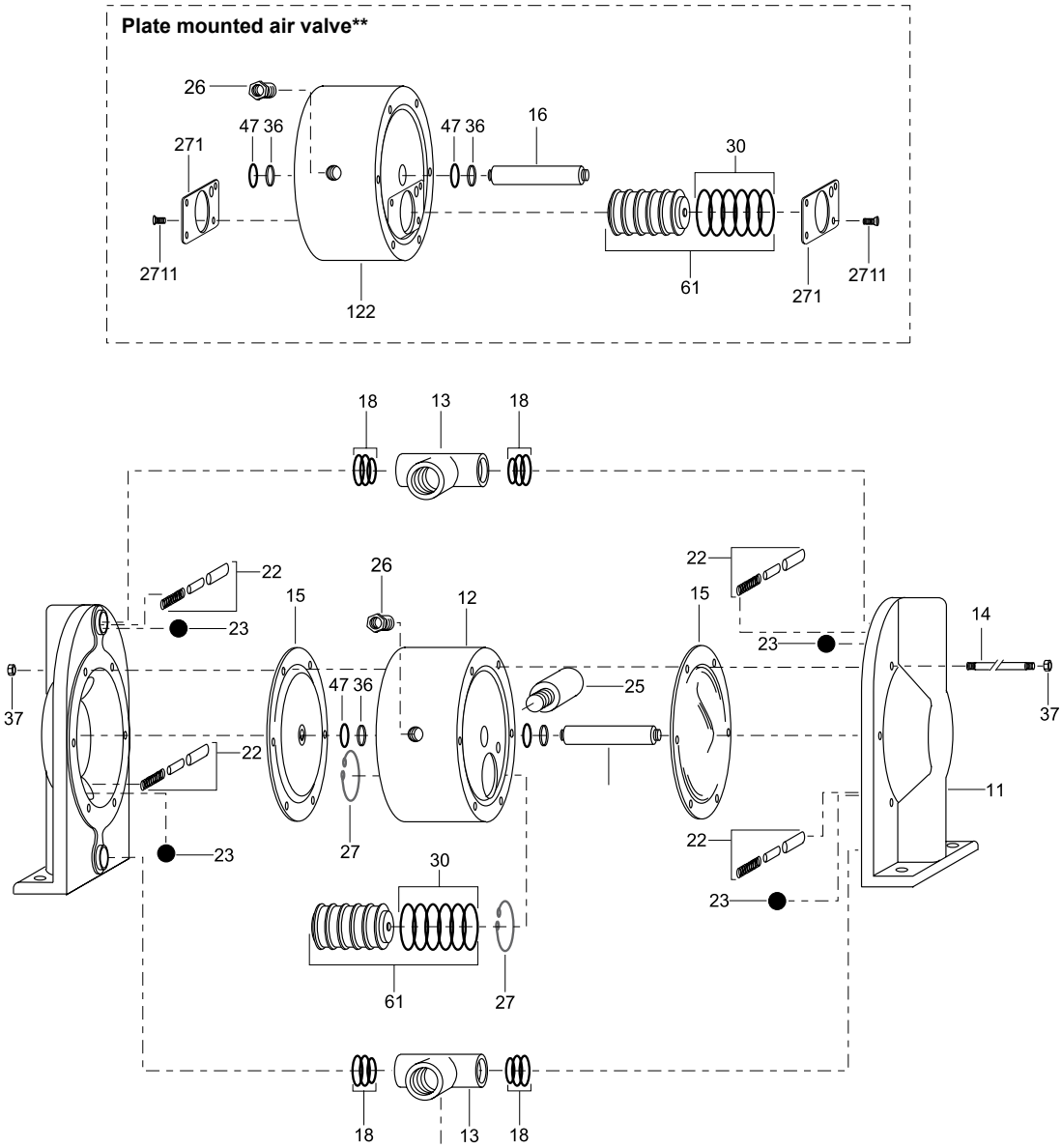
4.1.6 TX820 spare part list (aluminium)

Pos	Description	Qty/pump	Material options	Spare part sets set 1	set 2
11	Housing	2	Aluminium or PTFE coated aluminium		
12	Center block	1	Aluminium or PTFE coated aluminium		
13	In/outlet	2	Aluminium or stainless steel AISI 316L		
15	Diaphragm	2	EPDM, PTFE or NBR	•	•
16	Diaphragm shaft	1	AISI 316		•
18	O-ring/gasket (in/outlet)	4	klinger/NBR (standard), klinger/EPDM or klinger/FKM	•	•
22	Valve ball stop assembly	4	AISI 316		
223	O-ring valve ball stop	8	EPDM, NBR or FKM	•	•
23	Valve ball	4	EPDM, PTFE, NBR or PU	•	•
25	Muffler	1	PP	•	•
27	Circlip	2	Phosphor bronze		•
30	O-ring	6	NBR (standard), EPDM or FKM		
36	Center block sealing	4	PE		•
37	Screw	16	Steel		
38	Washer	16	AISI 304		
47	O-ring (back up for 36)	4	NBR (standard), EPDM or FKM		•
61	Air valve complete	1	PET/NBR (standard), PET/FKM or PET/EPDM		•
Options					
Flange connections					
70	Flange pipe	2	AISI 316		
71	Loose flange ring ANSI 150	2	AISI 316		
73	Loose flange ring DIN	2	AISI 316		

Other options
For pumps with valve lift system (TXL...) please ask us for spare part drawings/lists.

4.2 Spare parts stainless steel AISI 316 pumps

4.2.1 T70 and T120 (stainless steel)



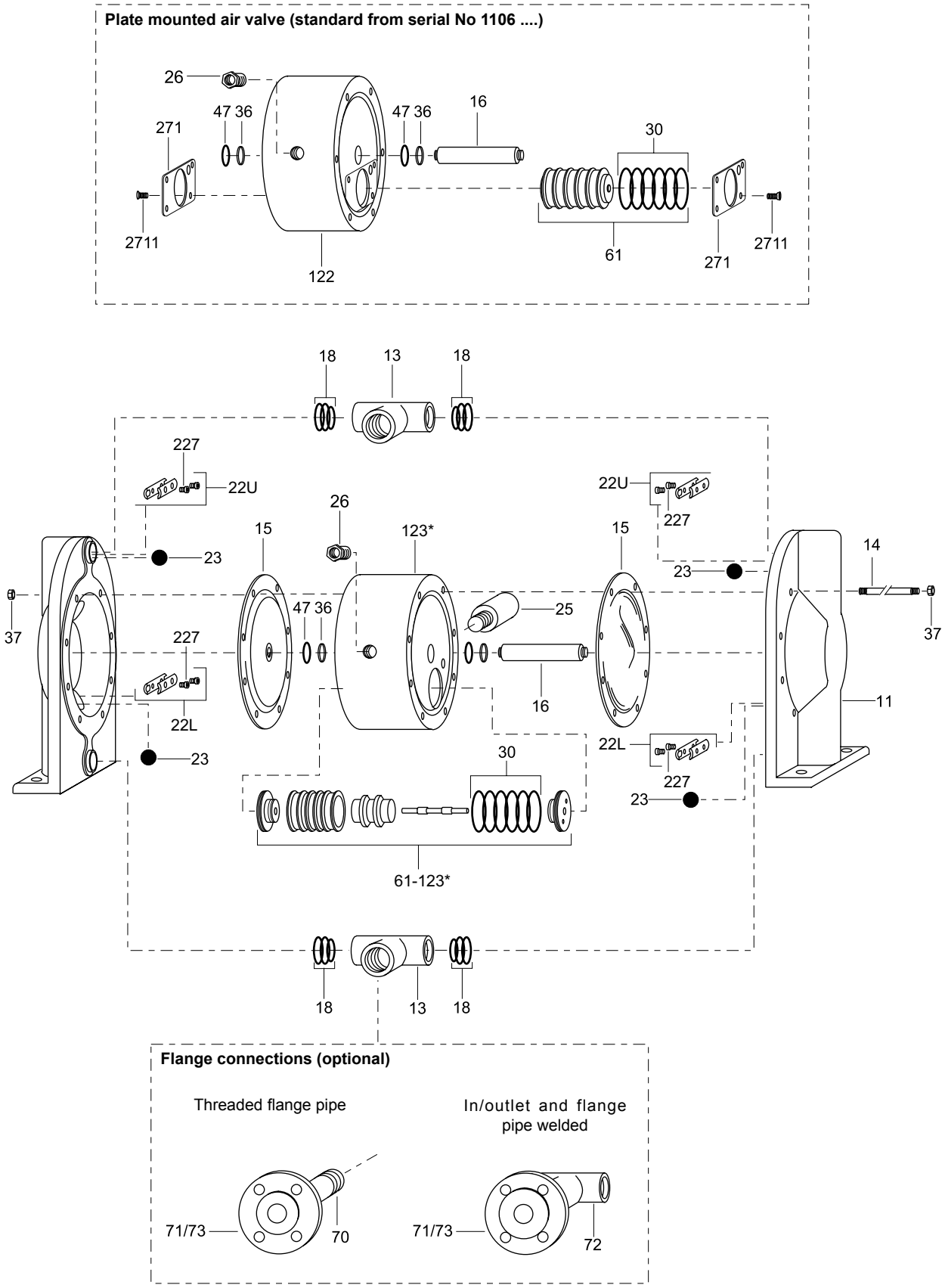
4.2.2 Spare part list T70 and T120 (stainless steel)

Pos	Description	Qty/pump	Material options	Spare part sets set 1	set 2
11	Housing	2	AISI 316		
12	Center block	1	AISI 316		
13	In/outlet	2	AISI 316		
14	Pin screw	6	AISI 316		
15	Diaphragm	2	EPDM, PTFE, NBR or FKM***	•	•
16	Diaphragm shaft	1	AISI 316		•
18	O-ringset (in/outlet)	4	FEP/silicon (standard) or FEP/FKM	•	•
22	Valve ball stop	4	AISI 316		
23	Valve ball	4	EPDM, PTFE, NBR, FKM, AISI 316, PU or ceramic	•	•
25	Muffler	1	PP	•	•
27	Circlip	2	Phosphor bronze		•
30	O-ring	6	NBR (standard), EPDM or FKM		
36	Center block sealing	2	PE		•
37	Nut	12	AISI 304		
47	O-ring (back up for 36)	2/4*	NBR (standard), EPDM or FKM		•
61	Air valve complete	1	Body brass (standard), AISI 316 or PET, o-rings NBR (standard), EPDM or FKM		•
Options					
Drum pump parts					
63	Drum inlet	1	AISI 316		
64	Pump tube	1	AISI 316		
65	Handle	1	AISI 316		
66	Domed nut	4	AISI 304		
67	Rubber foot	4	NBR		
Plate mounted air valve**					
122	Centerblock	1	PP or conductive PP		
271	Set 2 x plates (left and right)	1	AISI 316		
2711	Screw	8	AISI 316		
Flange connections					
70	Flange pipe (threaded)	2	AISI 316		
71	Loose flange ring ANSI 150	2	AISI 316		
72	Flange pipe/in/outlet welded	2	AISI 316		
73	Loose flange ring DIN	2	Loose flange ring		

* = T120 only
** = Standard on TX120 (ATEX) since serial No 0907, optional on other models

Other options
For pumps with valve lift system (TL...) or backup diaphragm pumps (TB...) please ask us for spare part drawings/lists.

4.2.3 Spare part drawing T220 and T420 (stainless steel)



* = Used in older pumps:
T220 from serial No 0803 .... until 1105 ....
T420 from serial No 0801 .... until 1105 ....

4.2.2 Spare part list T220 and T420 (stainless steel)

Pos	Description	Qty/pump	Material options	Spare part sets set 1	set 2
11	Housing	2	AISI 316		
122	Centerblock	1	PP or conductive PP		
13	In/outlet	2	AISI 316		
14	Pin screw	8	AISI 316		
15	Diaphragm	2	EPDM, PTFE, NBR	•	•
16	Diaphragm shaft	1	AISI 316		•
18	O-ringset (in/outlet)	4	FEP/silicon (standard) or FEP/FKM	•	•
22U	Valve ball stop (upper)	4	AISI 316		
22L	Valve ball stop (lower)	4	AISI 316		
227	Screw (valve ball stop)	8	AISI 316		
23	Valve ball	4	EPDM, PTFE, NBR, FKM, AISI 316, PU or ceramic	•	•
25	Muffler	1	PP	•	•
271	Set 2 x plates (L and R)	1	AISI 316		
2711	Screw	8	AISI 316		
30	O-ring	6	NBR (standard), EPDM or FKM		
36	Center block sealing	2	PE		•
37	Nut	16	AISI 304		
47	O-ring (back up for 36)	2	NBR (standard), EPDM or FKM		•
61	Air valve complete	1	Body brass (standard), AISI 316 or PET, o-rings NBR (standard), EPDM or FKM		•
Parts for older pumps*					
123	Center block	1	AISI 316		
61-123	Air valve complete	1	Body brass (standard), AISI 316 or PET, o-rings NBR (standard), EPDM or FKM		•
Options					
Flange connections					
70	Flange pipe (threaded)	2	AISI 316		
71	Loose flange ring ANSI 150	2	AISI 316		
72	Flange pipe/in/outlet welded	2	AISI 316		
73	Loose flange ring DIN	2	Loose flange ring		

Other options
For pumps with valve lift system (TL...) or backup diaphragm pumps (TB...) please ask us for spare part drawings/lists.

* = Used in older pumps:
T220 from serial No 0803 .... until 1105 ....
T420 from serial No 0801 .... until 1105 ....

4. SPARE PARTS

4.3 Stocking recommendation

Even at normal operation some details in the pump will be subject to wear. In order to avoid expensive breakdowns we recommend having a few spare parts in stock.

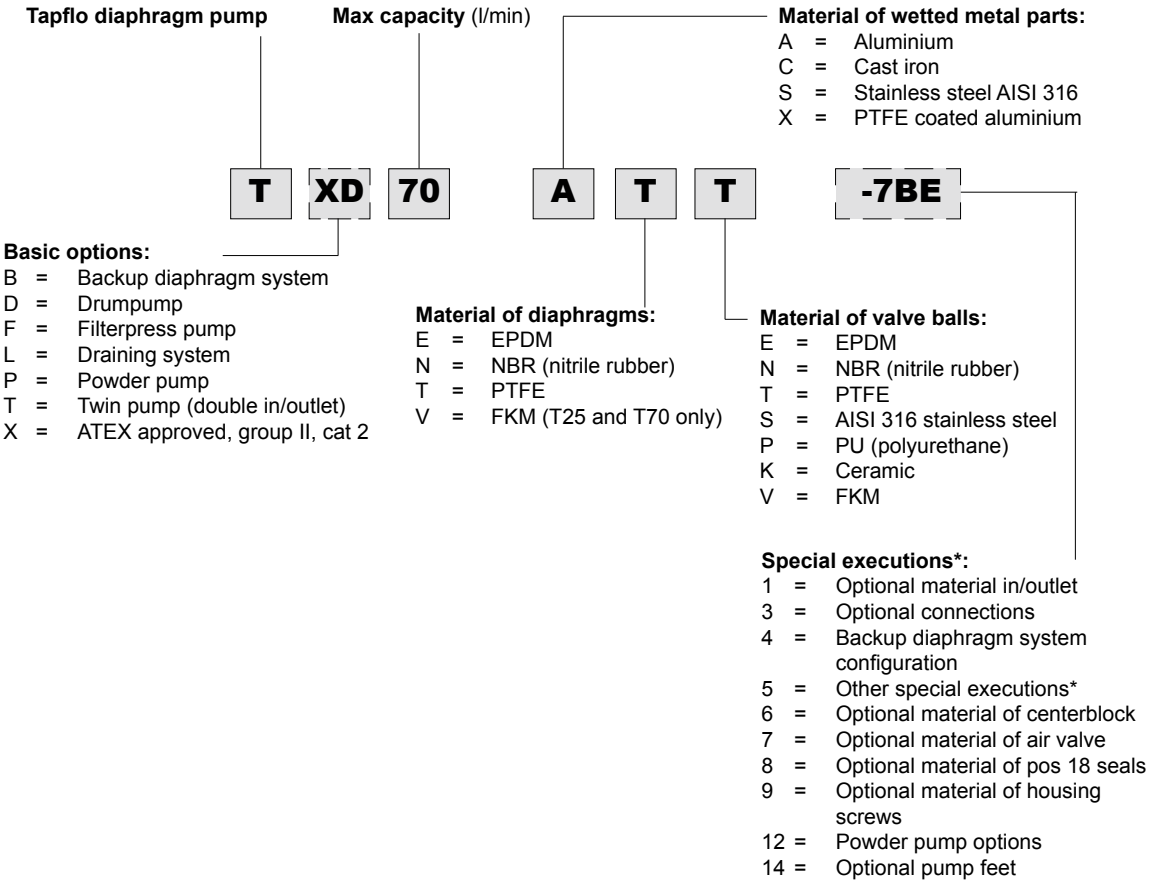
Depending on the severity of the operation and the importance of not having a breakdown we offer two different spare part sets, set 1 and set 2. Set 1 includes worn parts on the liquid side, while set 2 includes worn parts on both liquid side and air side. In the spare part lists you find which parts are included in respective sets.

4.4 How to order parts

When ordering spare parts for Tapflo Pumps, please let us know the ***model number*** from the nameplate of the pump. Then just indicate the part numbers (refered to the spare part list) and quantity of each item.

4.5 Pump code

The model number on the pump tells the pump size and material of the pump components.

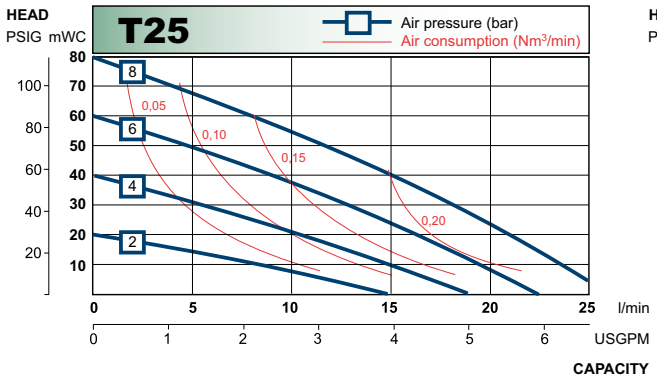

Tapflo diaphragm pump
Max capacity (l/min)
Material of wetted metal parts:
A = Aluminium
C = Cast iron
S = Stainless steel AISI 316
X = PTFE coated aluminium
T
XD
70
A
T
T
-7BE
Basic options:
B = Backup diaphragm system
D = Drumpump
F = Filterpress pump
L = Draining system
P = Powder pump
T = Twin pump (double in/outlet)
X = ATEX approved, group II, cat 2
Material of diaphragms:
E = EPDM
N = NBR (nitrile rubber)
T = PTFE
V = FKM (T25 and T70 only)
Material of valve balls:
E = EPDM
N = NBR (nitrile rubber)
T = PTFE
S = AISI 316 stainless steel
P = PU (polyurethane)
K = Ceramic
V = FKM
Special executions*:
1 = Optional material in/outlet
3 = Optional connections
4 = Backup diaphragm system configuration
5 = Other special executions*
6 = Optional material of centerblock
7 = Optional material of air valve
8 = Optional material of pos 18 seals
9 = Optional material of housing screws
12 = Powder pump options
14 = Optional pump feet

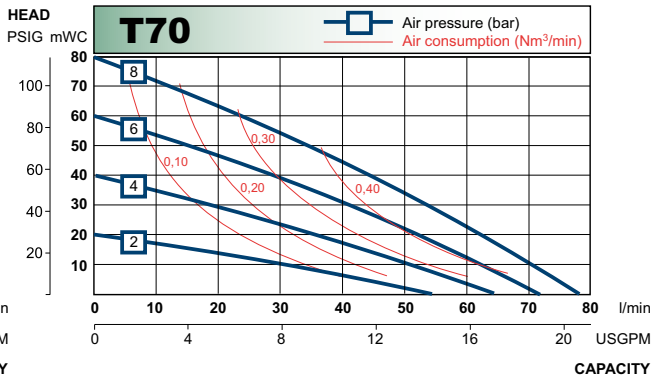
* = Ask us for complete pump code with all available options and executions

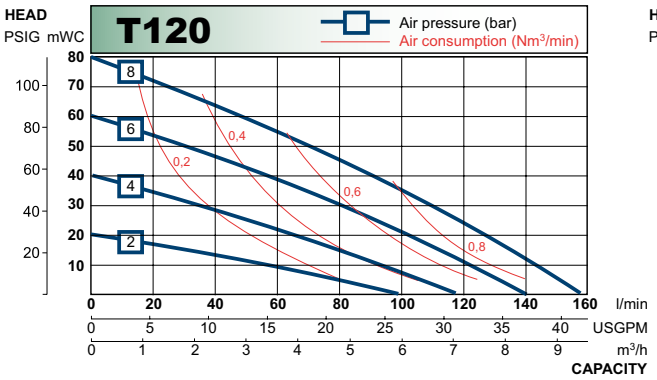
5. DATA

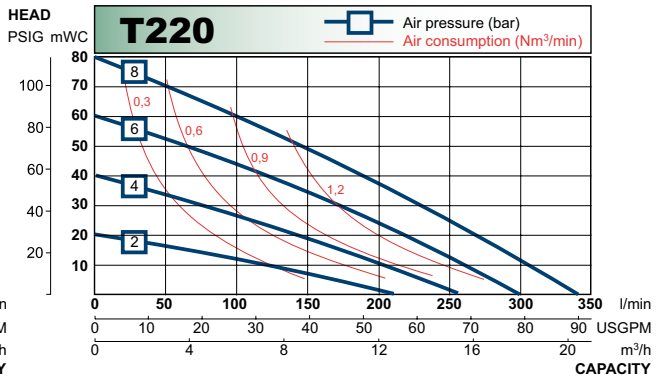
5.1 Capacity curves

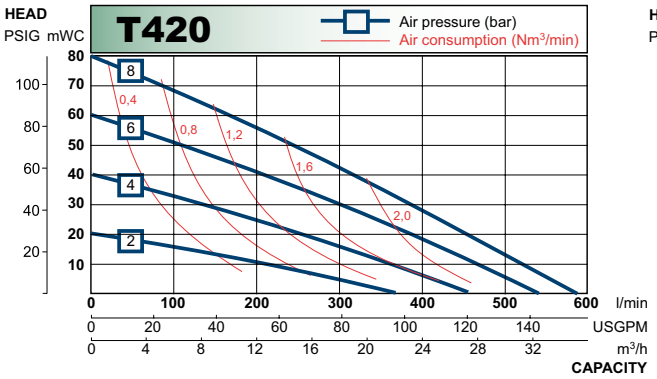
The performance curves are based on water at 20°C.Other circumstances might change the performance.See below how the capacity will change at different viscosities and suction lifts.

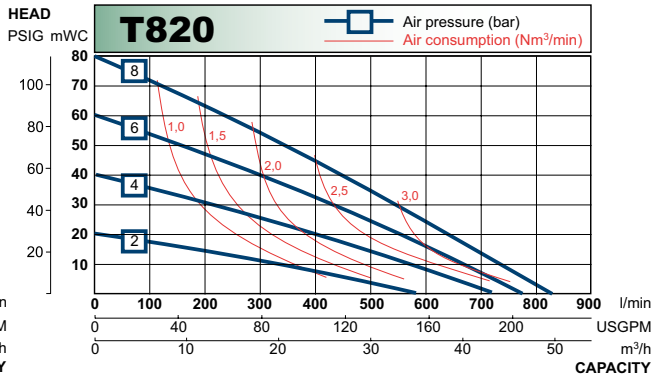






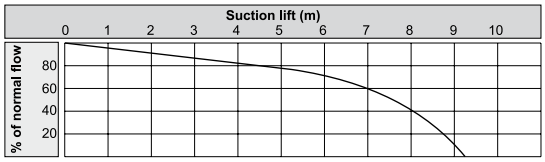




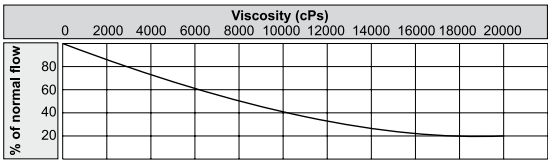


5.2 Capacity changes

Capacity changes at different suction lifts



Capacity changes at different viscosities



5. DATA

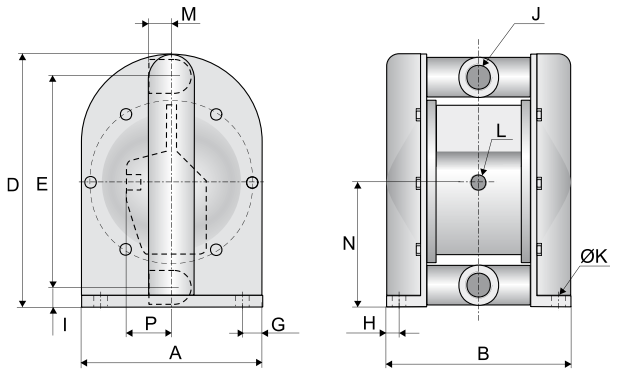
5.3 Dimensions

Dimensions for metal series

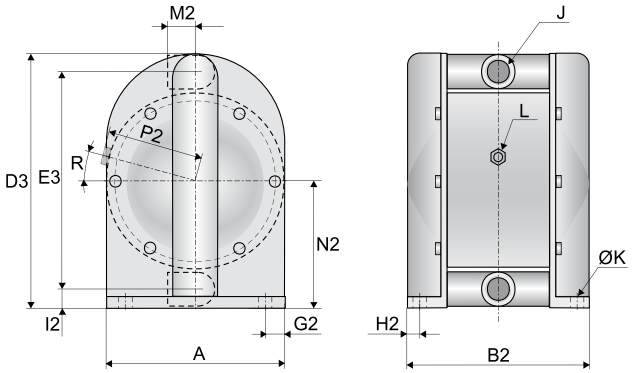
Dimensions in mm (where other is not indicated)
Dimensions in inch (where other is not indicated)

Dim	Pump size					
	25	70	120	220	420	820
A	105 4.13	150 5.91	200 7.87	270 10.63	350 13.78	470 18.50
B	116 4.57	168 6.61	195 7.68	265 10.43	342 13.46	488 19.21
B2	- -	156 6.14	204 8.03	280 11.02	344 13.54	- -
D	160 6.30	229 9.02	302 11.89	412 16.22	537 21.14	840 33.07
D2	173 6.81	249 9.80	322 12.68	- -	- -	- -
D3	- -	229 9.02	310 12.20	422 16.61	529 20.83	- -
E	132 5.20	190 7.48	252 9.92	346 13.62	449 17.68	688 27.09
E2	147 5.79	210 8.27	279 10.98	380 15.96	497 19.57	- -
E3	- -	192 7.56	257 10.12	348 13.70	442 17.40	- -
F	13 0.51	20 0.79	20 0.79	- -	- -	- -
G	10 0.39	17 0.67	20 0.79	25 0.98	35 1.38	50 1.97
G2	- -	17 0.67	20 0.79	31 1.22	35 1.38	- -
H	12 0.47	19 0.75	20 0.79	28 1.10	33 1.30	53 2.09
H2	- -	13 0.51	23 0.91	34 1.34	32 1.26	- -
I	15 0.59	20 0.79	27 1.06	34 1.34	48 1.89	82 3.22
I2	- -	19 0.75	27 1.06	36 1.42	45 1.77	- -
J	1/2” 1/2	3/4” 3/4	1” 1	1 1/2” 1 1/2	2” 2	3" 3
J2	3/8” 3/8	1/2” 1/2	3/4” 3/4	1” 1	1 1/2” 1 1/2	- -
ØK	6.5 0.26	8.5 0.33	8.5 0.33	8.5 0.33	8.5 0.33	12.5
L	1/8” 1/8	1/4” 1/4	1/4” 1/4	1/2” 1/2	1/2” 1/2	3/4" 3/4
M	19 0.75	29 1.14	33 1.30	44 1.73	57 2.24	84.5 3.33
M2	- -	40 1.57	52 2.05	70 2.76	90 3.54	- -
N	81 3.19	115 4.53	153 6.02	207 8.15	274 10.79	356 14.02
N2	- -	115 4.53	155 6.10	212 8.35	266 10.47	- -
P	30 1.18	47 1.85	36 1.42	57 2.24	60 2.36	72.5 -
P2	- -	80 3.15	105 4.13	143 5.63	183 7.20	- -
R	- -	15° 15°	15° 15°	0 0	0 0	- -
S	14.5 0.57	21.2 0.83	27 1.06	35 1.38	42 1.65	- -
ØT	20 0.79	30 1.18	30 1.18	- -	- -	- -
U	1270* 50.0*	1270* 50.0*	1270* 50.0*	- -	- -	- -
V	285 11.22	360 14.17	400 15.75	- -	- -	- -
	* = Any length up to 2000 mm on request * = Any length up to 79” on request					

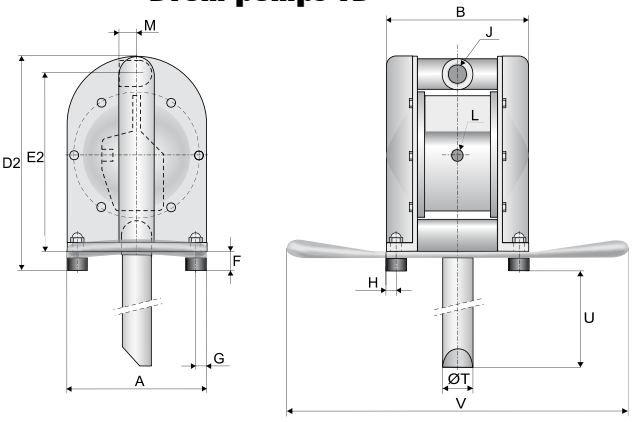
Aluminium and cast iron pumps T



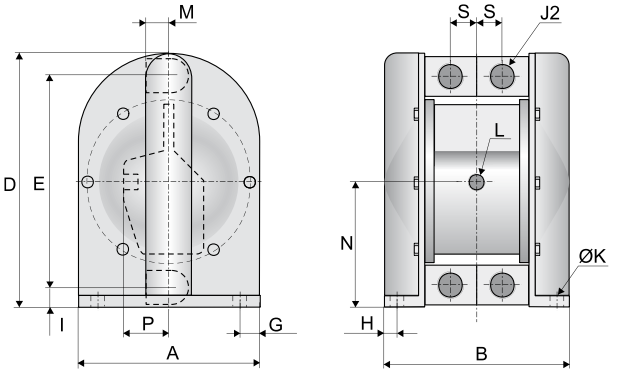
Stainless steel pumps T



Drum pumps TD



Twin pumps TT



5. DATA

5.4 Technical data

Data	Pump size					
	25	70	120	220	420	820
General characteristics						
*Max capacity (l/min) / (US gpm)	26 / 6.8	78 / 20	158 / 41	330 / 87	570 / 150	820 / 216
**Volume per stroke (ml) / (cu in)	70 / 4.27	87.5 / 5.34	420 / 25.6	933 / 56.9	2300/140.3	5125/312.7
Max discharge pressure (bar) / (psi)	8 / 116					
Max air pressure (bar) / (psi)	8 / 116					
Max suction lift dry (m) / (Ft)	1.5 / 4.9	3 / 9.8	4 / 13	4 / 13	4 / 13	4 / 13
Max suction lift wet (m) / (Ft)	8 / 26					
Max size of solids (ø in mm) / (in)	3 / 0.12	4 / 0.16	6 / 0.23	10 / 0.40	15 / 0.59	13 / 0.51
Max temp with EPDM/NBR (°C) / (°F)	80 / 176					
Max temp with PTFE (°C) / (°F)	110 / 230					
Min temperature (°C) / (°F)	-20 / -4					
Weight						
Standard pump in alu (kg) / (lb)	2 / 4.4	5 / 11	8 / 18	19 / 42	34 / 75	97 / 213
Standard pump cast iron (kg) / (lb)	7 / 15	10 / 22	17 / 37	44 / 97	80 / 176	-
Standard pump in AISI 316 (kg) / (lb)	-	7 / 15	16 / 35	38 / 84	68 / 150	-
Drum pump TD in alu (kg) / (lb)	3 / 6.6	7 / 15	10 / 22	-	-	-
Drum pump TD in AISI 316 (kg) / (lb)	-	9 / 20	-	-	-	-

* = Recommended flow is half of the the max flow, i.e. recommended flow for a T120 is 60 l/min (15.9 US gpm).
** = The value is based on pumps with EPDM diaphragms. Pumps with PTFE diaphragms have about 15% less volume.

5.5 Tightening torques

The following tightening torques are recommended.

Pump size	Aluminium and cast iron pumps Mounting torque (Nm)	Stainless steel pumps Mounting torque (Nm)
T25	8	-
T70	12	8
T120	17	16
T220	18	20
T420	20	23
T820	30	-

6. WARRANTY & REPAIR

6.1 Returning parts

When returning parts to Tapflo AB please follow this procedure:

- Consult Tapflo AB for shipping instructions.

- Cleanse or neutralize and rinse the part/pump. Make sure the part/pump is completely empty from liquid.

- Pack the return articles carefully to prevent any damage under transport.

Goods will not be accepted unless the above procedure has been complied with.

6.2 Warranty

Tapflo warrants products under conditions as below for a period of not more than 12 months from installation and not more than 24 months from date of manufacture.

1. The following terms and condition apply to the sale of machinery, components and related services and products, of Tapflo (hereinafter “the products”)

2. Tapflo (the manufacturer) warrants that:

a.) its products as being free of defects in material, design and workmanship at the time of original purchase;
b.) its products will function in accordance with Tapflo operative manuals; Tapflo does not guarantee that the product will meet the precise needs of the Customer, except for those purposes set out in any invitation to render documents or other documents specifically made available to Tapflo before entering into this agreement;
c.) high quality materials are used in the construction of the pumps and that machining and assembly are carried out to the highest standards.

Except as expressly stated above, Tapflo makes no warranties, express or implied, concerning the products, including all warranties of fitness for a particular purpose.

3. This warranty shall not be applicable in circumstances other than defects in material, design, and workmanship. In particular warranty shall not cover the following:

a.) Periodic checks, maintenance, repair and replacement of parts due to normal wear and tear (seals, O-rings, rubber items, bushings, etc..);
b.) Damage to the product resulting from:
b.1.) Tampering with, abuse or misuse, including but not limited to failure to use the product for its normal purposes as stated at the time of purchase or in accordance withTapflo instructions for use and maintenance of the product, or the installation or improper ventilation or use of the product in a manner inconsistent with the technical or safety standard in force;

b.2.) Repairs performed by non skilled personell or use of non original Tapflo parts

b.3.) Accidents or any cause beyond the control of Tapflo, including but not limited to lightning, water, fire, earthquake, and public disturbances, etc.;

4 The warrantee shall cover the replacement or repairing of any parts, which is documentedly faulty due to construction or assembling, with new or repaired parts free of charges delivered by Tapflo. Parts subjected to normal tear and wear shall not be covered by the warranty. Tapflo shall decide as to whether the defective or faulty part shall be replaced or repaired.

5 The warrantee of the products shall be valid for a period in accordance to the current law from the date of delivery, under the condition that notice of the alleged defect to the products or parts thereof be given to Tapflo in written within the mandatory term of 8 days from the discovery.

6 Repair or replacement under the terms of this warranty shall not give a right to an extension to, or a new commencement of, the period of warranty. Repair or replacement under the terms of this warranty may be fulfilled with functionally equivalent reconditioned units. Tapflo qualified personnel shall be solely entitled to carry out repair or replacement of faulty parts after careful examination of the pump. Replaced faulty parts or components will become the property of Tapflo

7 The products are built in accordance with standard CE normative and are tested (where applicable) by Tapflo. Approval and tests by other control authority are for the customers account. The products shall not be considered defective in materials, design or workmanship if they need to be adapted, changed or adjusted to conform to national or local technical or safety standards in force in any country other than that for which the unit was originally designed and manufactured. This warranty shall not reimburse such adaptations, changes or adjustments, or attempt to do so, whether properly performed or not, nor any damage resulting from them, nor any adaptation, change or adjustments to upgrade the products from their normal purpose as described in the products operative manual without the prior written consent of Tapflo

8 Installation, including electric and other connections to utility mains according to Tapflo drawings, is for the cost and responsibility of the customer, unless otherwise agreed in writing.

9 Tapflo will not be liable on any claim, whether in contact, tort, or otherwise, for any indirect, special, incidental, or consequential damages, caused to the customer or to third parties, including loss of profits, arising by any possible infringement of par. 3 above or by the customer or third parties being in the impossibility of using the products.

Steady the above,Tapflo liability to the customer or third parties from any claim, whether in contract, tort, or otherwise, shall be limited to the total amount paid by the customer for the product that caused the damages.

6.3 Warranty form

Company: _____

Telephone: _____ Fax: _____

Address: _____

Country: _____ Contact name: _____

E-mail: _____

Delivery date: _____ Pump was installed (date): _____

Pump type: _____ Serial No (stamped on the pump housing): _____

Description of the fault: _____

_____

_____

The installation

Liquid: _____

Temperature (°C): _____ Viscosity (cPs): _____ Spec. grav. (kg/m³): _____ pH-value: _____

Contents of particles: _____ %, of max size (mm): _____

Flow (l/min): _____ Duty (h/day): _____ No of starts per day: _____

Discharge head (mwc): _____ Suction head/lift (m): _____

Air pressure (bar): _____ Quality of the air (filter, micron?, lubrication?): _____

Other: _____

_____

_____

Place for sketch of the installation